

AMENDMENTS TO THE CLAIMS:

1. *(Currently Amended)* Method of providing a radio frequency output signal-(55), comprising the steps of:
 - determining an instantaneous size measure of an input signal-(35), said size measure being an amplitude or therefrom derivable quantity;
 - deriving a drive signal (26) from said input signal-(35);
 - providing a bias signal-(36), being dependent on said instantaneous size measure; and
 - amplifying said drive signal (26) using a bias level according to said bias signal (36) into said radio frequency output signal-(55);

characterized in that

whereby said bias signal (36)-dependency on said instantaneous size measure gives rise to an increased nonlinearity in said amplifying step.
2. *(Currently Amended)* Method according to claim 1, **characterized in that** whereby said bias signal (36)-gives an amplification according to one of class C and class B for instantaneous size measures within a first amplitude range, and said bias signal (36)-being higher than class B amplification for instantaneous size measures above said first amplitude range.
3. *(Currently Amended)* Method according to claim 2, **characterized in that** whereby said bias signal (36)-is controlled to give essentially a class A bias level at maximum amplitude.

4. (*Currently Amended*) Method according to ~~any of the claims 1-to-3, characterized in that~~ whereby said bias signal providing step is controlled for producing a predetermined output characteristics, whereby a bias signal amplitude-averaged over an amplitude interval comprising all amplitudes in an entire amplitude range supported by said amplifying step above a first amplitude is higher than a bias signal amplitude-averaged over said entire amplitude range.

5. (*Currently Amended*) Method according to ~~any of the claims 1-to-4, characterized in that~~ wherein said deriving step comprises the step of modifying said input signal (35).

6. (*Currently Amended*) Method according to claim 5, ~~characterized in that~~ wherein said deriving step comprises the step of pre-distorting said input signal (35)-dependent (47)-on said instantaneous size measure.

7. (*Currently Amended*) Method according to claim 5, ~~characterized in that~~ wherein said deriving step comprises the step of modifying said input signal (35)-by a feedback arrangement.

8. (*Currently Amended*) Method according to ~~any of the claims 1-to-7, characterized in that~~ wherein said bias signal (36)-is controlled to, for all amplitudes within a first amplitude range-(11), increase with increasing amplitude.

9. (*Currently Amended*) Method according to ~~any of the claims 1-to-8, characterized in that~~ wherein said bias signal (36)-is controlled to be, for all amplitudes within a second

amplitude range-(12), lower than said bias signal amplitude-averaged over said entire amplitude range.

10. *(Currently Amended)* Method according to claim 8-~~or 9~~, **characterized in that** wherein said first amplitude range (11) comprises maximum amplitude.

11. *(Currently Amended)* Method according to claim 6, **characterized by** comprising the further steps of:

selecting a pre-distortion function having a predetermined bandwidth; and
adapting bias signal (36) according to said pre-distortion function.

12. *(Currently Amended)* Method according to claims 11, **characterized in that** wherein said pre-distortion function contains predominantly low-order components.

13. *(Currently Amended)* Method according to ~~any of the claims 6, 11 or 12~~, **characterized by** comprising the further steps of:

selecting said bias signal (36) according to predetermined relations; and
adapting said pre-distortion function according to said bias signal-(36).

14. *(Currently Amended)* Method according to ~~any of the claims 1 to 13~~, **characterized in that** wherein said output characteristics, at least for a third amplitude range-(13), is linear.

15. (*Currently Amended*) Method according to claim 14, **characterized in that** wherein said output characteristics is substantially linear over the entire amplitude range.

16. (*Currently Amended*) Method according to ~~any of the claims 1 to 13~~, **characterized in that** wherein said output characteristics comprises a substantially zero output signal within a fourth amplitude range ~~(14)~~.

17. (*Currently Amended*) Method according to ~~any of the claims 1 to 16~~, **characterized by** comprising the further steps of:

determining a feedback signal ~~(46)~~ of said radio frequency output signal ~~(55)~~; and
adapting said drive signal ~~(26)~~ and/or said bias signal ~~(36)~~ according to said feedback signal ~~(46)~~.

18. (*Currently Amended*) Method according to claim 6, **characterized by** comprising the further steps of:

causing said pre-distorting and bias signal providing steps to be simultaneous at the input of said amplification.

19. (*Currently Amended*) Method according to claim 18, **characterized in that** wherein said causing step in turn comprises at least one of the steps of:

inverse filtering of said drive signal ~~(26)~~ with respect to a first signal path ~~(51)~~ to an amplifying element ~~(50)~~;

delay compensation of said drive signal (26) with respect to said first signal path (51) to an amplifying element (50);

inverse filtering of said bias signal (36) with respect to a second signal path (52) to said amplifying element (50); and

delay compensation of said bias signal (36) with respect to said second signal path (52) to said amplifying element (50).

20. (*Currently Amended*) Method according to ~~any of the claims 1 to 19, characterized by~~ comprising the further step of:

compensating current saturation at high amplitude end.

21. (*Currently Amended*) Use of a method according to ~~any of the claims 1 to 20~~ in a radio frequency amplifier arrangement of a type selected from the list of:

Doherty amplifier arrangement (60);

Chireix amplifier arrangement; and

amplifier arrangements using envelope and restoration enhancement techniques.

22. (*Currently Amended*) Radio frequency power amplifier (2; 62, 64), comprising:
input signal terminal (19);
input detector (40) arranged to determine an instantaneous size measure of a signal (35) on said input signal terminal (19), said size measure being an amplitude or therefrom derivable quantity;

drive signal deriving means (20) connected to said input signal terminal (19), providing a drive signal (26);

bias signal generator (30) providing a bias signal (36), said bias signal generator (30) being connected to said input detector (40) and being controlled dependent (47) on said instantaneous size measure; and

amplifying element (50), connected to said drive signal deriving means (20) and said bias signal generator (30);

characterized in that

whereby said bias signal generator (36) being controlled to gives rise to an increased nonlinearity in said amplifying element (50).

23. (*Currently Amended*) Radio frequency power amplifier according to claim 22,

characterized in that wherein said bias signal generator (30) is arranged to give an amplification in said amplifying element (50) according to one of class C and class B for instantaneous size measures within a first amplitude range, and to give a bias signal (36) being higher than class B amplification for instantaneous size measures above said first amplitude range.

24. (*Currently Amended*) Radio frequency power amplifier according to claim 22 or 23,

characterized in that wherein said bias signal generator (30) is arranged to give a bias signal amplitude-averaged over an amplitude interval comprising all amplitudes in an entire amplitude range supported by said amplifying element (50) above a first amplitude is higher than a bias signal amplitude-averaged over said entire amplitude range.

25. (*Currently Amended*) Radio frequency power amplifier according to ~~any of the claims 22 to 24, characterized in that~~—wherein said drive signal deriving means comprises pre-distorting means (20) connected to said input detector (40), being controlled dependent (47) on said instantaneous size measure.

26. (*Currently Amended*) Radio frequency power amplifier according to ~~any of the claims 22 to 25, characterized in that~~—wherein said bias signal generator (30) in turn comprises means giving a bias signal (36), which for all amplitudes within a first amplitude range (11), increase with increasing amplitude.

27. (*Currently Amended*) Radio frequency power amplifier according to ~~any of the claims 22 to 26, characterized in that~~—wherein said bias signal generator (30) in turn comprises means giving a bias signal (36), which for all amplitudes within a second amplitude range (12), is lower than an amplitude-averaged bias signal (16).

28. (*Currently Amended*) Radio frequency power amplifier according to claim 25, **characterized by** further comprising:

feed-back arrangement (48), in turn comprising a feedback sensor (41) monitoring said output of said amplifier element (50) and adaptation means (44) connected said bias signal generator (30) and said pre-distortion means (20) for providing said bias signal generator (30) and said pre-distortion means (20) with a feedback signal (53, 54);

said bias signal generator (30) and said pre-distortion means (20) being arranged to adapt their actions according to said feedback signal-(53, 54).

29. (*Currently Amended*) Radio frequency power amplifier according to ~~any of the claims 22 to 28~~, **characterized by** further comprising:

simultaneousness-causing means (21, 31) for causing said drive signal (26) and bias signal (36) to be simultaneous at in input of said amplifying element-(50).

30. (*Currently Amended*) Radio frequency power amplifier according to claim 29, **characterized in that** wherein said coincidence causing means in turn comprises at least one of:

inverse filter (21) connected between said pre-distortion means (20) and said amplifying element-(50), for compensating for a first signal path (51) to said amplifying element-(50); and

inverse filter (31) connected between said bias signal generator (30) and said amplifying element-(50), for compensating for a second signal path (52) to said amplifying element-(50).

31. (*Currently Amended*) Composite radio frequency power amplifier-(60), **characterized by** comprising at least one radio frequency power amplifier (2, 62, 64) according to ~~any of the claims 22 to 30~~ as a sub-amplifier.

32. (*Currently Amended*) Composite radio frequency power amplifier according to claim 31, **characterized in that** wherein said composite radio frequency power amplifier is selected from the list of:

Doherty amplifier arrangement-(60);

Chireix amplifier arrangement; and
amplifier arrangements using envelope elimination and restoration techniques.

33. (*Currently Amended*) Transmitter, having a radio frequency power amplifier (2; 62, 64), said radio frequency power amplifier (2; 62, 64) comprising:

input signal terminal (19);

input detector (40) arranged to determine an instantaneous size measure of a signal (35) on said input signal terminal (19), said size measure being an amplitude or therefrom derivable quantity;

drive signal deriving means (20) connected to said input signal terminal (19), providing a drive signal (26);

bias signal generator (30) providing a bias signal (36), said bias signal generator (30) being connected to said input detector (40) and being controlled dependent (47) on said instantaneous size measure; and

amplifying element (50), connected to said drive signal deriving means (20) and said bias signal generator (30);

characterized in that

whereby said bias signal generator (36) being controlled to gives rise to an increased nonlinearity in said amplifying element (50).

34. (*Currently Amended*) Transmitter according to claim 33, **characterized in that** wherein said bias signal generator (30) is arranged to give an amplification in said amplifying element (50) according to one of class C and class B for instantaneous size measures within a

first amplitude range, and to give a bias signal (36) being higher than class B amplification for instantaneous size measures above said first amplitude range.

35. (*Currently Amended*) Transmitter according to claim 33-~~or~~34, **characterized in that** wherein said bias signal amplitude-averaged over an amplitude interval comprising all amplitudes in an entire amplitude range supported by said amplifying element (50) above a first amplitude is higher than a bias signal amplitude-averaged over said entire amplitude range.

36. (*Currently Amended*) Transmitter according to ~~any of the~~ claims 33-~~to~~35, **characterized in that** wherein said drive signal deriving means comprises pre-distorting means (20) connected to said input detector (40), being controlled dependent (47) on said instantaneous size measure.

37. (*Currently Amended*) Transmitter according to ~~any of the~~ claims 33-~~to~~36, **characterized in that** wherein said bias signal generator (30) in turn comprises means giving a bias signal (36), which for all amplitudes within a first amplitude range (11), increase with increasing amplitude.

38. (*Currently Amended*) Transmitter according to ~~any of the~~ claims 33-~~to~~37, **characterized in that** wherein said bias signal generator (30) in turn comprises means giving a bias signal (36), which for all amplitudes within a second amplitude range (12), is lower than an amplitude-averaged bias signal (16).

39. (*Currently Amended*) Transmitter according to claim 38, **characterized in that**
wherein said second amplitude range (12) covers at least half the amplitude distribution (15).

40. (*Currently Amended*) Transmitter according to claim 38-~~or 39~~, **characterized in that**
wherein said pre-distortion means (20) comprises means for making said drive signal (26) larger
than said input signal (35) at least in said second amplitude range (12).

41. (*Currently Amended*) Wireless communication system (1), having a radio frequency
power amplifier (2; 62,64), said radio frequency power amplifier (2; 62, 64) comprising:

input signal terminal (19);

input detector (40) arranged to determine an instantaneous size measure of a signal (35)
on said input signal terminal (19), said size measure being an amplitude or therefrom derivable
quantity;

drive signal deriving means (20) connected to said input signal terminal (19), providing a
drive signal (26);

bias signal generator (30) providing a bias signal (36), said bias signal generator (30)
being connected to said input detector (40) and being controlled dependent (47) on said
instantaneous size measure; and

amplifying element (50), connected to said drive signal deriving means (20) and said bias
signal generator (30);

characterized in that

whereby said bias signal generator (36) being controlled to gives rise to an increased
nonlinearity in said amplifying element (50).

42. (*Currently Amended*) Base station (9) of a wireless communication system-(1), having a radio frequency power amplifier-(2; 62, 64), said radio frequency power amplifier (2; 62, 64) comprising:

input signal terminal-(19);

input detector (40) arranged to determine an instantaneous size measure of a signal (35) on said input signal terminal-(19), said size measure being an amplitude or therefrom derivable quantity;

drive signal deriving means (20) connected to said input signal terminal-(19), providing a drive signal-(26);

bias signal generator (30) providing a bias signal-(36), said bias signal generator (30) being connected to said input detector (40) and being controlled dependent (47) on said instantaneous size measure; and

amplifying element-(50), connected to said drive signal deriving means (20) and said bias signal generator-(30);

characterized in that

whereby said bias signal generator (36) being controlled to gives rise to an increased nonlinearity in said amplifying element-(50).

43. (*Currently Amended*) Mobile unit (8) of a wireless communication system-(1), having a radio frequency power amplifier-(2; 62, 64), said radio frequency power amplifier (2; 62, 64) comprising:

input signal terminal-(19);

input detector (40) arranged to determine an instantaneous size measure of a signal (35) on said input signal terminal (19), said size measure being an amplitude or therefrom derivable quantity;

drive signal deriving means (20) connected to said input signal terminal (19), providing a drive signal (26);

bias signal generator (30) providing a bias signal (36), said bias signal generator (30) being connected to said input detector (40) and being controlled dependent (47) on said instantaneous size measure; and

amplifying element (50), connected to said drive signal deriving means (20) and said bias signal generator (30);

characterized in that

whereby said bias signal generator (36) being controlled to gives rise to an increased nonlinearity in said amplifying element (50).